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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,885	10/25/2001	Anthony J. Ticknor	A070	7551

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EXAMINER	
ARTMAN, THOMAS R	
ART UNIT	**PAPER NUMBER**
2882	

DATE MAILED: 10/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/003,885	TICKNOR, ANTHONY J.	
	Examiner	Art Unit	
	Thomas R Artman	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-10,12,13,17,18,20,21 and 23* is/are rejected.

7)☒ Claim(s) *3,11,14-16,19 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claim does not further limit the subject matter of parent claim 1 because it recites a limitation of a process step that does not further limit the structure of the apparatus.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4-10, 12, 13, 17, 18, 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ziari (US 6,404,542) and in view of Modavis (US 5,881,187).

Regarding claims 1, 9 and 17, Ziari discloses an optical integrated circuit (Fig.3) and a method, including:

1) (providing) a waveguide (item 314) extending axially through a portion of a base (item 312) along an optical path, and

2) (forming) a polarization swapping portion (item 310) in order to mitigate birefringence in the optical circuit.

Ziari does not form the polarization swapping portion in the waveguide. His polarization swapping portion is a separate optical element, formed using polarized light (col.3, lines 32-45), that is placed in the waveguide structure.

Modavis teaches the well-known concept of laser-writing optical elements into waveguides. This is a common practice, particularly with complicated optical elements such as Bragg gratings. Writing optical elements into a waveguide rather than using separate optical elements is well established in the art for several reasons. First, size and cost of the finished optical circuits are greatly reduced. Furthermore, the manufacturing is simplified and the reliability of the resulting circuit is improved since the precise optical alignment of separate elements is not required. The optical elements are formed by exposing photosensitive cores (or claddings) of waveguides in order to change the refractive index in a specific region.

Modavis also teaches that exposing these regions with polarized light has the same effect as disclosed by Ziari, where the birefringent axes of the optical elements are directly affected by the linear polarization state of the laser light and the angle of exposure. Modavis teaches that the angle of exposure can be controlled so that desired birefringent effects can be created in the waveguide.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a polarization swapping portion in Ziari's waveguide, rather than using a separate optical element, for the improved reliability, simplified manufacturing and reduced size and cost as is generally known in the art and as is supported by Modavis.

Regarding claims 2, 7-8, 10, 13, 18, 21 and 23, Ziari does not disclose the illumination angle at which his polarization swapping portion is illuminated.

Throughout Modavis's discussion, the teaching is repeated wherein the illumination angle of the linearly polarized light dictates the orientation of the induced birefringent axes, as measured with respect to the principle axes of the waveguide. Furthermore, it is a well-known fact in the art to place a polarizing element, such as a quarter-wave or half-wave element, with it's principle axes at approximately 45 degrees to the principle axes of the rest of the optical system in order to function as designed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the polarization swapping portion (half-wave optical element, in Zairi's case) by illuminating the waveguide at 45 degrees from it's principle axes such that the portion behaves as a proper polarization swapping element.

With respect to claims 4, 12 and 20, Ziari does not specifically disclose the light source used in the formation of the polarization-swapping portion. Modavis, however, states that a common light source for waveguide writing include lasers for the appropriate wavelengths desired (UV to visible, col.3, lines 48-51). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a laser as one of several common, well characterized light sources for the appropriate radiation wavelengths.

With respect to claim 5, Ziari's polarization swapping portion, as well as Modavis' altered portions, has a refractive index different from the waveguide.

With respect to claim 6, as stated by Ziari, his polarization swapping portion is, in fact, a half-wave plate.

Allowable Subject Matter

Claims 11, 14-16, 19 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither teaches nor reasonably suggests the additional limitation of using femto-second pulsed laser light for making laser-written optical waveguides as claimed in claims 11, 14, 15, 19 and 22.

The prior art of record neither teaches nor reasonably suggests the additional limitation of using a prism for directing the laser light onto the waveguide as claimed in claim 16.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dragone (US 5,625,723), Greene (US 5,506,925) and Albert (US 6,374,016) teach the advantages of laser writing polarization-dependent elements in optical waveguides using photosensitive materials.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Thomas R. Artman
Patent Examiner
October 2, 2003

DAVID V. BRUCE
PRIMARY EXAMINER